

Application/Control Number: 10/773,934

Examiner: Group, Karl E

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IN THE CLAIMS

Please amend the claims of the present application under the provisions of 37 C.F.R. §1.121(c), as indicated below:

1. (Currently amended): Glass-ceramics having an average linear thermal expansion coefficient within a range of  $0.0 \pm 0.2 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from  $0^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ , having difference between the maximum value and the minimum value of  $\Delta L/L$  of  $10 \times 10^{-7}$  or below, and comprising  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$  and  $\text{P}_2\text{O}_5$  with the total amount thereof in mass % being within a range from 86.7% to 89.0% and further comprising CaO in an amount of 0.5 mass % or more, wherein the ratio of  $\text{P}_2\text{O}_5$  to  $\text{Al}_2\text{O}_3$  in mass % is within a range from 0.270 to 0.33 and the ratio of  $\text{P}_2\text{O}_5$  to  $\text{SiO}_2$  in mass % is within a range from 0.1230 to 0.1450.

2. (Cancelled)

3. (Currently amended) Glass-ceramics having an average linear thermal expansion coefficient within a range of  $0.0 \pm 0.1 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from  $0^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ , having difference between the maximum value and the minimum value of  $\Delta L/L$  of  $8 \times 10^{-7}$  or below, and comprising  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$  and  $\text{P}_2\text{O}_5$  with the total amount thereof in mass % being within a range from 86.7% to 89.0% [[%]] and further comprising CaO in an amount of 0.5 mass % or more, wherein the ratio of  $\text{P}_2\text{O}_5$  to  $\text{Al}_2\text{O}_3$  in mass % is within a range from 0.270 to 0.33 and the ratio of  $\text{P}_2\text{O}_5$  to  $\text{SiO}_2$  in mass % is within a range from 0.1230 to 0.1450.

4. (Cancelled)

5. (Original): Glass-ceramics as defined in claim 1 wherein surface roughness ( $R_a$ ) (arithmetic mean roughness) is  $3\text{\AA}$  or below.

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6. (Original): Glass-ceramics as defined in claim 1 wherein an average crystal grain diameter of precipitating crystal phase or phases is within a range from 50 nm to 90 nm.

7. (Original): Glass-ceramics as defined in claim 1 which comprise  $\beta$ -quartz ( $\beta$ -SiO<sub>2</sub>) and/or  $\beta$ -quartz solid solution ( $\beta$ -SiO<sub>2</sub> solid solution) as a predominant crystal phase.

8. (Original): Glass-ceramics as defined in claim 1 which are free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>.

9. (Original): Glass-ceramics as defined in claim 1 obtained by heat treating, for crystallization, a base glass which comprises, in mass %,

SiO <sub>2</sub>	53-57%
P <sub>2</sub> O <sub>5</sub>	7.0-8.5% and
Al <sub>2</sub> O <sub>3</sub>	23-26%

and is substantially free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>, said glass-ceramics comprising  $\beta$ -quartz ( $\beta$ -SiO<sub>2</sub>) and/or  $\beta$ -quartz solid solution ( $\beta$ -SiO<sub>2</sub> solid solution) as a predominant crystal phase.

10. (Original): Glass-ceramics as defined in claim 9 comprising, in mass %, Li<sub>2</sub>O within a range of 3.5-4.5%.

11. (Previously presented): Glass-ceramics as defined in claim 10 comprising, in mass %,

CaO	0.5-1.5% and
MgO	0.5-1.5% and/or
ZnO	0.1-1.5% and/or
BaO	0.5-1.5% and/or
TiO <sub>2</sub>	1.5-3.0% and/or
ZrO <sub>2</sub>	1.0-3.0% and/or

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As<sub>2</sub>O<sub>3</sub> 0.5-1.0%.

12. (Original): Glass-ceramics as defined in claim 1 wherein the maximum temperature of the heat treatment for crystallization is within a range from 750°C to 800°C.

13. (Previously presented): A mask for lithography using glass-ceramics as defined in claim 1.

14. (Previously presented): An optical system reflecting mirror for lithography using glass-ceramics as defined in claim 1.

15. (Previously presented): A wafer stage or a reticle stage for lithography using glass-ceramics as defined in claim 1.

16. (Previously presented): A component part of a precision instrument using glass-ceramics as defined in claim 1.

17. (Original): Glass-ceramics as defined in claim 3 wherein surface roughness (Ra) (arithmetic mean roughness) is 3Å or below.

18. (Original): Glass-ceramics as defined in claim 3 wherein an average crystal grain diameter of precipitating crystal phase or phases is within a range from 50 nm to 90 nm.

19. (Original): Glass-ceramics as defined in claim 3 which comprise β-quartz (β-SiO<sub>2</sub>) and/or, β-quartz solid solution (β-SiO<sub>2</sub> solid solution) as a predominant crystal phase.

20. (Original): Glass-ceramics as defined in claim 3 which are free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>.

21. (Original): Glass-ceramics as defined in claim 3 obtained by heat treating, for crystallization, a base glass which comprises, in mass %,

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SiO <sub>2</sub>	53-57%
P <sub>2</sub> O <sub>5</sub>	7.0-8.5% and
Al <sub>2</sub> O <sub>3</sub>	23-26%

and is substantially free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>, said glass-ceramics comprising  $\beta$ -quartz ( $\beta$ -SiO<sub>2</sub>) and/or  $\beta$ -quartz solid solution ( $\beta$ -SiO<sub>2</sub> solid solution) as a predominant crystal phase.

22. (Original): Glass-ceramics as defined in claim 21 comprising, in mass %, Li<sub>2</sub>O within a range of 3.5-4.5%.

23. (Previously presented): Glass-ceramics as defined in claim 22 comprising, in mass %,

CaO	0.5-1.5% and
MgO	0.5-1.5% and/or
ZnO	0.1-1.5% and/or
BaO	0.5-1.5% and/or
TiO <sub>2</sub>	1.5-3.0% and/or
ZrO <sub>2</sub>	1.0-3.0% and/or
As <sub>2</sub> O <sub>3</sub>	0.5-1.0%.

24. (Original): Glass-ceramics as defined in claim 3 wherein the maximum temperature of the heat treatment for crystallization is within a range from 750° C to 800° C.

25. (Previously presented): A mask for lithography using glass-ceramics as defined in claim 3.

26. (Previously presented): An optical system reflecting mirror for lithography using glass-ceramics as defined in claim 3.

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27. (Previously presented): A wafer stage or a reticle stage for lithography using glass-ceramics as defined in claim 3.

28. (Previously presented): A component part of a precision instrument using glass-ceramics as defined in claim 3.

29. (Original): Glass-ceramics as defined in claim 2 obtained by heat treating, for crystallization, a base glass which comprises, in mass %

SiO <sub>2</sub>	53-57%
P <sub>2</sub> O <sub>5</sub>	7.0-8.5% and
Al <sub>2</sub> O <sub>3</sub>	23-26%

and is substantially free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>, said glass-ceramics comprising  $\beta$ -quartz ( $\beta$ -SiO<sub>2</sub>) and/or  $\beta$ -quartz solid solution ( $\beta$ -SiO<sub>2</sub> solid solution) as a predominant crystal phase.

30. (Original): Glass-ceramics as defined in claim 29 comprising, in mass %, Li<sub>2</sub>O within a range of 3.5-4.5%.

31. (Previously presented): Glass-ceramics as defined in claim 30 comprising, in mass %,

CaO	0.5-1.5% and
MgO	0.5-1.5% and/or
ZnO	0.1-1.5% and/or
BaO	0.5-1.5% and/or
TiO <sub>2</sub>	1.5-3.0% and/or
ZrO <sub>2</sub>	1.0-3.0% and/or
As <sub>2</sub> O <sub>3</sub>	0.5-1.0%.

32. (Original): Glass-ceramics as defined in claim 4 obtained by heat treating, for

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crystallization, a base glass which comprises, in mass %,

SiO <sub>2</sub>	53-57%
P <sub>2</sub> O <sub>5</sub>	7.0-8.5% and
Al <sub>2</sub> O <sub>3</sub>	23-26%

and is substantially free of PbO, Na<sub>2</sub>O, K<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>, said glass-ceramics comprising β - quartz (β -SiO<sub>2</sub>) and/or β -quartz solid solution (β -SiO<sub>2</sub> solid solution) as a predominant crystal phase.

33. (Original): Glass-ceramics as defined in claim 32 comprising, in mass %, Li<sub>2</sub>O within a range of 3.5-4.5%.

34. (Previously presented): Glass-ceramics as defined in claim 33 comprising, in mass %,

CaO	0.5-1.5% and
MgO	0.5-1.5% and/or
ZnO	0.1-1.5% and/or
BaO	0.5-1.5% and/or
TiO <sub>2</sub>	1.5-3.0% and/or
ZrO <sub>2</sub>	1.0-3.0% and/or
As <sub>2</sub> O <sub>3</sub>	0.5-1.0%.